

RESPONSE

Support

Applicants have amended claims 17, 18 and 19 to specify that the weight ratio of conventional to high vinylidene PIB used to derive the compounds of the present invention range from 15:85 to 60:40. Support for these new claims is found on page 6 lines 32 to page 7 line 3 of the specification and specifically on page 7 line 3.

No other elements of the claims have been amended.

Response

The Examiner rejected claims 17-19 under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement. Applicants have amended the claims to specify that the weight ratio of conventional PIB to high vinylidene PIB used to derive the compounds of the present invention range from 15:85 to 60:40. This range of ratios is clearly supported by the specification. Applicants respectfully request that the rejections under 112 be removed.

The Examiner rejected claims 1-13 and 17-19 under 35 U.S.C. 103(a) as being unpatentable over Carabell (US 2003/0172582). The Examiner reads Carabell as teaching Mannich fuel additives derived from polyisobutylenes (PIB) that, among other embodiments, may have a methylvinylidene isomer content of at least 20%. The Examiner appears to conclude that this teaching in Carabell at least makes obvious the features of the present invention specifying a mixture of conventional PIB and high vinylidene PIB. Applicants respectfully disagree.

Applicants submit that the current 103(a) rejection is deficient and fails to establish a prima facie case of obviousness. The office action lacks the required rationale for identifying the source of several features required by the present invention. As the current rejection does not address all of the features of the present claims and so relies on mere conclusory statements with regards to these features, the rejection is improper and should be removed.

Specifically, Applicants note that the claims specify that the additives of the present invention are derived from a combination of conventional PIB and a high vinylidene PIB. The claims further specify that the PIB alkylated hydroxyaromatic

compound is derived by: i) combining conventional PIB and high vinylidene PIB prior to the alkylation reaction or ii) combining a hydroxyaromatic compound alkylated with conventional PIB and a hydroxyaromatic compound alkylated with high vinylidene PIB.

Carabell does not teach these features. The Examiner does not cite any additional reference or source that does teach these features. The Examiner does not address the feature of requiring a mixture of conventional PIB and high vinylidene PIB in the current office action.

The Examiner does refer to paragraph [0056] in Carabell when referring to PIB. The Examiner states that Carabell teaches additives derived from PIB where the PIB may contain at least about 20% methylvinylidene isomer. The Examiner appears to read this as covering embodiments of mixtures of conventional PIB and high vinylidene PIB, however neither this conclusion nor any supporting reasoning is provided in the office action.

Applicants point out that Carabell teaches it's preferred PIB is high vinylidene PIB. The reading of the entire reference makes this clear particularly the rest of paragraph [0056] which notes the preferred PIB is made via a BF_3 catalyzed process. Applicants also note that the reference's specific vinylidene contents, listed in paragraph [0057] are 76% and 74%, which is consistent with typical high vinylidene PIB. Furthermore, the actual examples in Carabell list the PIB used as containing at least 70% methylvinylidene isomer (see paragraph [0103]).

Carabell teaches that it's preferred PIB is high vinylidene PIB. It has no specific teachings regarding conventional PIB and certainly has no teaching regarding the use of a mixture of conventional PIB and high vinylidene PIB. In contrast the present invention specifies the use of a mixture of conventional PIB and high vinylidene PIB in the preparation of its additives. This feature is not taught by the reference.

If the Examiner is of the position that a mixture of conventional PIB and high vinylidene PIB is essentially equivalent to high vinylidene PIB having a lower than normal methylvinylidene isomer content, and so Carabell teaches the features of the present invention, Applicants respectfully disagree.

Applicants include with this response a Journal of Organic Chemistry article (*2D-INADEQUATE Structural Assignment of Polybutene Oligomers*, Journal of Organic

Chemistry 1997, 62, 693-699) that discusses the significant differences between conventional PIB and high vinylidene PIB. The article shows that the two materials are made via different processes, use different catalysts, and contain different end groups and different ranges of end groups. In other words, conventional PIB and high vinylidene PIB are two different materials such that a mixture of conventional PIB and high vinylidene PIB is significantly different from a high vinylidene PIB, even if the methylvinylidene isomer content of the mixture and the high vinylidene PIB is the same.

Therefore, the high vinylidene PIB of Carabell is not the same material nor essentially equivalent to the mixture of conventional PIB and high vinylidene PIB specified by the present invention. Furthermore, Carabell provides no basis on which one skilled in the art would consider using such a mixture. Therefore, the present claims are both novel and non-obvious over the reference.

Even if the Examiner is not persuaded by the arguments above, Applicants note that the data in the specification shows a surprising result obtained by the use of a mixture of conventional PIB and high vinylidene PIB. The results show that the compositions of the present invention provide IVD performance better than one would expect given the difference in performance of the 100% conventional PIB and 100% high vinylidene PIB derived examples. Applicants submit that these results show that Mannich reaction products derived from combinations of conventional and high vinylidene PIB provide results that are not inline with expectations.

Even if the Examiner maintains that Carabell would lead one skilled in the art to consider the use of a mixture of conventional PIB and high vinylidene PIB, the provide provides no basis or teaching that use of such a mixture would result in additives that perform at least as well or even better than additives prepared from high vinylidene PIB. Such results, as demonstrated by the data in the specification, are not taught by Carabell, nor the included journal article, and represent an unexpected result over the teachings of the prior art. Therefore the present claims are non-obvious over the cited reference and should be allowed.

Conclusion.

For the foregoing reasons it is submitted that the present claims are novel and non-obvious, and in condition for allowance. The foregoing remarks are believed to be a full and complete response to the outstanding office action. Therefore an early and favorable reconsideration is respectfully requested. If the Examiner believes that only minor issues remain to be resolved, a telephone call to the Undersigned is suggested.

Any required fees or any deficiency or overpayment in fees should be charged or credited to deposit account 12-2275 (The Lubrizol Corporation).

Respectfully submitted,

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